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Communication Needs and Approaches for Visitor Management: A Case Study of the Allegheny National Forest

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July 2003

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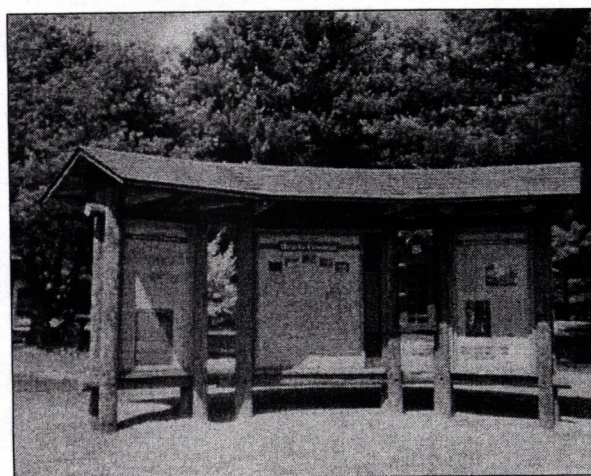
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EXECUTIVE SUMMARY

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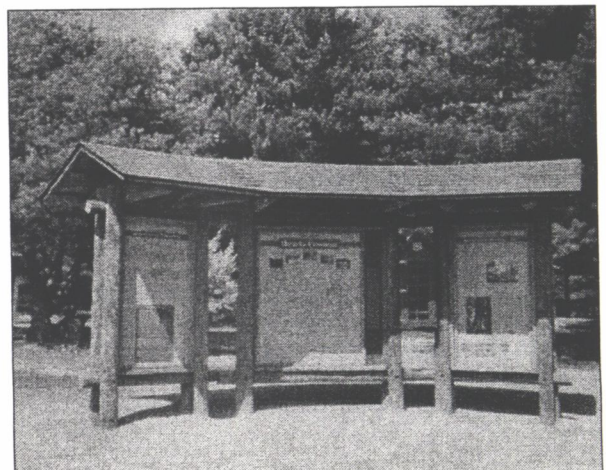
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recreationists' attitudes, and more importantly, creates an acceptable behavioral ethic during and after the visit to a recreational setting.

The Hickory Creek Wilderness, located in Pennsylvania's Allegheny National Forest, suffers from inappropriate uses such as illegal ATV and motorized trailbike use, litter and improper disposal of garbage, encroachment from private camps, mountain biking, camping too close to trails and streams, and inappropriate group sizes.



Many of these problems could conceivably be addressed through comprehensive communication, information and education programs. The purpose of this study was to enhance existing understanding of communication, information and education as resource management techniques. This study provides an analysis of diverse user groups' knowledge, behavior, and attitudes

about Wilderness in general and the Hickory Creek Wilderness in particular.

Surveys were conducted with five key user groups of the Hickory Creek Wilderness and surrounding areas of the Allegheny National Forest. Users of the Hearts Content Campground, Hearts Content Scenic Area and Hickory Creek Wilderness Area completed a two-page on-site interview and were asked to participate in a follow-up mail survey. Adjacent landowners and equestrians were sampled with a mail survey methodology. Both mail surveys utilized three first-class mailings. Response rates for the various groups were 61% for the Wilderness users, 48% for adjacent landowners, and 41% for the equestrians.

The user groups studied varied in their demographic characteristics, use patterns, and information uses and preferences. Wilderness users tended to be the youngest while adjacent landowners were the oldest user group. Although all users reported fairly high levels of education, Wilderness, campground and scenic area users tended to be more educated than horse users and landowners. The user groups also differed in their activity participation. Wilderness users, not surprisingly, were the most likely (74%) and scenic area day users the least

likely (5%) to report backpacking.

Conversely, scenic area users were the most likely (95%) and horse users the least likely (47%) to report day hiking or walking.

Picnicking was fairly common across all groups, with landowners and scenic area users reporting the most participation (40-42%) and equestrians (33%) and Wilderness users (24%) the least.

Participation in hunting and fishing was highest for the surrounding landowner group, followed by the horse users.

Visitors were most interested in information on the location of trails and landscape features (i.e. maps). The majority of visitors would prefer to receive such information before their visit.

Wilderness area visitors were more likely than the other groups, however, to have obtained information prior to their trip. In general, maps and signs were the most frequently consulted information sources, followed by travel guides and tour books, brochures and pamphlets and visitor centers. The least often used sources included TV or radio, newspapers, outdoor clubs, and sporting goods stores.

Comparing the use of specific sources of information for planning trips and vacations, horse users and landowners were more likely than the Wilderness or Scenic

Area visitors to rely on their own experience or word of mouth sources like friends, relatives or neighbors. The equestrians and landowners were also more likely to use outdoor clubs and organizations and sporting goods stores for information. Wilderness and campground users, on the other hand, were much more likely than the other groups to use hiking guidebooks.



Forest users preferred different sources for different types of information. For example, while ranger stations and brochures were considered good places to obtain nearly all types of information, sporting goods stores were additional preferred sources for maps and information about hunting and fishing in the area.

Wilderness users and campground users scored higher on a "leave no trace" knowledge quiz than adjacent landowners and equestrians. Readers of non-

consumptive outdoor and environmental magazines showed more knowledge of LNT principles than readers of consumptive and equine sports magazines. Magazines can serve as a source of “off-site” information to supplement brochures and signs, and might be especially effective if targeting the consumptive recreationists and equestrians.

The study also reports data on differences and similarities across five user groups on seven experience, attitude and knowledge aspects of site use including trip planning, prior visitation, satisfaction, trip motivation, place attachment, customer



service (experience) attributes and Leave-no-Trace knowledge scores.

In general, Wilderness users tend to report the greatest information needs and are most likely to seek information before their trip. Adjacent landowners are mainly interested in information about hunting and fishing opportunities, and are least satisfied with existing information services. Day users at the Hearts Content Scenic area generally expressed lower information needs and used fewer sources, but were interested in natural and cultural history information. Campers in the adjacent developed campground were generally similar to the scenic area users, and were most satisfied with the ease of getting information. Horse users rely most heavily on ranger stations and trailhead signs for their information and expressed the greatest need for information about rules and regulations. Study results demonstrate the importance of knowing your customers and your windows of opportunity for information and education programs.

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COMMUNICATION NEEDS AND APPROACHES FOR VISITOR MANAGEMENT: A CASE STUDY OF THE ALLEGHENY NATIONAL FOREST

Introduction

Visitor management is an important part of any impact management plan. Numerous management problems occur because of ill-prepared, uninformed or misinformed visitors. Visitor behaviors, especially inappropriate, depreciative, and unintentional uses impact other visitors' experiences and may also damage the resource base. A variety of direct and indirect strategies to manage behaviors have been employed to optimize visitor satisfaction as well as safeguard and sustain the recreational setting. Direct strategies include various types of policies or tactics to regulate behavior such as limits on party size, type of activity participation or police enforcement. Indirect strategies relate to subtle measures such as education and creating awareness. A direct strategy that includes coercive persuasion usually produces desired results. However, the effectiveness in influencing recreationists' beliefs or attitudes is questionable (Ajzen 1992). Indirect visitor management techniques tend to be less intrusive as well as educational, and hence seem to be preferred management tools. This is particularly true in wilderness settings, where strict regulation of visitors, extensive facility development, environmental control, and engineered solutions are not appropriate options for achieving management objectives.

The use of education in resource management has typically employed various print and non-print communication media, such as interpretive bulletin boards, flyers and brochures. The role of education is to instill awareness, generate interest and influence or modify behavior. Educational programs are only effective if the information positively influences recreationists' attitudes and, more importantly, creates an acceptable behavioral ethic during and after the visit to a recreational setting (Cole 1999). For example, Oliver, Roggenbuck and Watson (1985) identified a fifty percent decrease in tree damage and litter in a campground as a result of creating awareness among campers about low-impact camping via brochures. Correspondingly, Cole, Hammond and McCool (1997) found that hikers

exhibited a significant increase in knowledge after exposure to environmental messages encouraging low-impact practices.

Although the use of interpretive bulletin boards, flyers and brochures yields some optimistic results, the overall effectiveness is questionable as the process of such non-formal education is voluntary among recreationists. Hence, the message is constrained due to the inability to reach all recreationists (Cole et al. 1997). Face-to-face communication can be more effective, due to the credibility of the source of information (Knopf & Dustin 1992); for example, a backcountry ranger informing a backpacker about the risks involved in the backcountry. Roggenbuck and Berrier (1982) found better effectiveness with the use of brochures and personal contacts among campers. Also, the outcome was more effective for small groups comprised of three to six people. Similarly, Cockrell, Bange and Roggenbuck (1984) identified that, within small groups, direct and personal communication by river guides provided better outcomes in influencing or shaping norms. Furthermore, Olson, Bowan and Roth (1984) noted an increase in visitors' knowledge and changed attitudes via the use of brochures and direct personal communications, while they indicated a lack of effectiveness of signs. However, the use of personal contact does pose challenges to resource managers, largely due to the costs involved as well as mobilization of scarce human resources.

It should be noted that the success of transfer of information/education is dependent upon the recreationists' level of experience and their degree of specialization in forest recreation activities. First-time visitors are more likely than repeat visitors to seek information and learn about the setting. Hence, they would be more inclined to read the information provided by management, such as interpretive bulletin boards, attached flyers and brochures. On the other hand, repeat visitors or skilled recreations might be more likely to pursue personal contact to gather additional information about the setting. For example, Williams and Huffman (1986) reported that specialized hikers demonstrated a greater propensity to seek additional information than non-specialized hikers, and noted a difference in the process of information use by more and less experienced visitors. Moreover, based on their study, Brown, Halstead and Luloff (1992) showed that information was also helpful to expert hikers.

The value visitors place on various types of information should be of importance to managers. For example, a topographic map of the area will not be easy to decipher for a beginner or novice. Too much displayed information could cause information overload to a visitor. Cole et al. (1997) found this to be the case for hikers when messages were increased. The quality of information shared during the contact is also important. For example, Brown et al. (1992) noted that less than 20 percent of hikers modified their behavior following contact with wilderness rangers. Besides the content, quantity and quality of the message, visual aesthetics such as design elements should also be considered (Cole et al. 1997).

Much of the process of education is concentrated on-site within the resource setting. This means that the learning environment is informal and that attention to the educational message is optional. If information is received prior to site visitation or activity participation, there is the possibility that users will be more aware of appropriate behaviors. To achieve this objective, it is essential to understand the process of information search, as well as preferences for communication media among visitors (Brown, McCool & Manfredo 1987). The process of information search varies from beginners to experts (Manfredo 1988), as well as among various demographic indicators such as age, income, gender and ethnicity (Graefe, Thapa & Absher 2000).

Recently, Graefe, et al. (2000) studied two National Forests in California and showed that brochures and flyers were considered the most preferred source of information, followed by rangers or other Forest Service employees (the majority of respondents used both within the past year). However, the most common source of information about the forest and Forest Service was word of mouth from family or friends, with almost three-fifths of respondents reporting as such. Forest users were very satisfied with both the accuracy and usefulness of information received via traditional sources including rangers and family/friends. They were much less satisfied with the accuracy and usefulness of information received through technology-based sources such as the Internet, radio and television.

Other results indicated that campers were more satisfied than day users with the accuracy and usefulness of information received from brochures/flyers, and were also more likely to have sought information from rangers or other Forest Service employees. Campers were also more satisfied than non-campers with the accuracy of information they received

from rangers or other employees. Non-whites were more likely to rank brochures/flyers as their most preferred source of information about the forest. Those with the lowest incomes were least likely to seek information from rangers or other Forest Service employees, and those with the highest incomes were less likely to rely on notices on bulletin boards at forest sites while more likely to use the Internet for information. Finally, visitors on longer trips generally were less satisfied with the accuracy and usefulness of information received from radio, television, newspapers, magazines or guidebooks.

Information needs and communication behaviors are critical to effective management of visitor behaviors. Based upon visitors' information needs and communication behaviors, managers should be able to concentrate their efforts in terms of indirect visitor management techniques.

The Hickory Creek Wilderness, located in Pennsylvania's Allegheny National Forest, suffers from inappropriate uses such as illegal ATV and motorized trailbike use, litter and improper disposal of garbage, encroachment from private camps, mountain biking, individuals clearing and blazing their own trails, camping too close to trails and streams, and inappropriate and large group sizes. At least some of these problems can be directly linked to lack of knowledge. For example, some of the visitors that signed the Wilderness trail register listed mountain biking as their activity, an inappropriate (and illegal) activity in the Wilderness. Such problems could conceivably be addressed through comprehensive communication, information and education programs.

Study Goals and Objectives

The goal of this study was to enhance existing understanding of communication, information and education as management techniques. This study provides an analysis of diverse user groups' knowledge and attitudes about Wilderness in general and the Hickory Creek Wilderness in particular. The study is intended to demonstrate a methodology to identify gaps in visitor knowledge that could reduce the effectiveness of communication techniques and provide generalized guidance for the development of a site-specific Information and Education plan. The objectives of this report are as follows:

1. To identify and describe distinct user groups and stakeholders (i.e. Wilderness visitors, adjacent landowners, day users, backpackers, equestrian users) that should be targeted with an effective and efficient communication and education program in the study area.
2. To determine various stakeholder groups' level of awareness and knowledge about the Allegheny National Forest, the National Wilderness Preservation System (NWPS) and specific land management policies/options.
3. To identify information sources used and desired by these diverse publics and evaluate the content, effectiveness and accuracy of these sources as tools for visitor management.

Methods

Study Site

The study site was a section of Allegheny National Forest (ANF). Located in northwestern Pennsylvania, it is the only National Forest in the state (see Figure 1). Presidential Proclamation established the forest in 1923 under the authority of the 1911 Weeks Act. The study sites included were the Hickory Creek Wilderness Area (HCWA) and the adjacent Heart's Content Scenic Area (HCSA) and Heart's Content Recreation Area (HCRA), which feature a campground (moderately developed), a day-use/picnic area, and an old growth forest with a short interpretive trail (see Figure 2). The HCWA encompasses 9,337 acres and features the Hickory Creek Trail (HCT), a loop trail of about 11 miles.

The HCWA is one of only two congressionally designated units of the National Wilderness Preservation System (NWPS) in Pennsylvania, Delaware, and Maryland. The other unit is the Allegheny Islands Wilderness, also located in the Allegheny National Forest near the Hickory Creek area. This pocket Wilderness includes seven islands totaling only 368 acres on the Allegheny River. Other surrounding states with limited federal Wilderness resources include Ohio (1 USF&WS areas: 77 acres), New York (1 NPS areas: 1,363 acres), and New Jersey (2 USF&WS areas: 10,341 acres). The closest states with substantial Wilderness lands are Virginia (1 NPS and 15 USFS areas: 169,453 acres) and West Virginia (6 USFS areas: 43,988 acres).

Outdoor recreation opportunities on the ANF are managed under the terms of the Multiple Use-Sustained Yield Act of 1960. Other uses on the forest include production of wood products; oil, gas and mineral extraction; watershed protection; habitat for wildlife and fisheries; and wilderness. The forest lies within a day's drive of one-third of the Nation's population, hence recreation use remains fairly high. According to recent forest estimates recreation use continues to increase, with dispersed activities becoming increasingly popular. The estimated recreation use for 1998 was 3.9 million Recreation Visitor Days (RVDs). This use includes activities such as mechanized travel and viewing scenery (46%); camping, picnicking and swimming (26%); hunting and fishing (10%); and other forms of recreation including hiking, horseback riding, water travel, winter sports, organized camping, nature

study, wilderness use, gathering forest products, attending talks and viewing interpretive exhibits (18%).

Selection of Subjects

A combination of survey methods was used to collect data. A stratified sampling plan was developed to represent the major user groups of the national forest. Users of the Hearts Content Campground, Hearts Content Scenic Area and Hickory Creek Wilderness Area were contacted through an on-site survey during the 1997 summer season. Subjects completed a two-page personal interview and were asked to participate in a follow-up mail survey. Adjacent landowners, equestrians, and other stakeholders that might have been missed in the on-site survey were sampled with a mail survey methodology. These additional groups were identified as follows:

1. Adjacent landowners were selected from tax rolls acquired from the tax assessor's office in the two counties (Warren and Forest) adjacent to the study area.
2. Equestrian users were identified from a list of attendees to an equestrian management meeting held by the Forest the previous year.
3. Additional Wilderness users were identified through a trail register at the entrance to the Hickory Creek Wilderness.

Both mail surveys utilized a modified Dillman (2000) approach including three first-class mailings. The initial packet included a letter describing the study, an 8-page survey and a self-addressed, stamped return envelope. For visitors in the on-site sample, this initial mailing was sent approximately one to two weeks after the on-site interview. The second contact, a thank you/reminder postcard, was sent approximately two weeks after the initial mailing. A third and final contact composed of a complete survey package (letter, survey & return envelope) was sent about two weeks after the postcard reminder to those individuals who had not responded to the first two contacts.

This multi-stage data collection strategy was selected to maximize the input from a variety of stakeholders. Since the actual proportion of each user group in the Hickory Creek/Hearts Content stakeholder population cannot be determined with any degree of certainty, the raw data could not be weighted to reflect the actual makeup of the population of study area. Therefore, to insure valid results in the analysis process, the sample was

treated as five separate and distinct groups: Wilderness users, campground users, scenic area users, equestrian users and adjacent landowners.

Most of the visitors (99%) approached on-site agreed to participate in the interview and surveyors recoded only 3 refusals. Also, a very high percentage (94%) consented to participate in the follow-up survey and gave accurate, legible addresses. Of the 253 visitors agreeing to complete a follow-up mail survey, 154 (61%) actually completed and returned the instrument (see Table 1).

Table 1. Sample Distribution

On-Site Survey	n	Percent of Respondents
Total On-site Contacts	268	100%
Completed/Response rate	265	99%
Refusals	3	1%
Wilderness users	95	36%
Scenic area users	62	23%
Campground users	108	41%
Mail Follow-up		100%
Readable addresses	253	94%
Returned/Response rate	154	61%
Wilderness users	55	36%
Scenic area users	36	23%
Campground users	63	41%
Mail Survey	n	Percent of Respondents
Wilderness users	203	
Readable addresses	170	100%
Returned/Response rate	88	52%
Equestrian users	250	
Readable addresses	239	100%
Returned/Response rate	99	41%
Adjacent landowners	395	
Readable addresses	374	100%
Returned/Response rate	178	48%

Of the 203 Wilderness users that had provided their addresses on the trail register, 170 had valid, legible addresses and these addresses yielded 88 completed surveys, a 52 percent response rate. These were combined with the 55 Wilderness respondents from the on-site sample to yield a final sample size of 143 Wilderness users.

The equestrian users were surveyed only through the mail survey procedure and had a significantly lower response rate. Of the 250 names and addresses from the equestrian management workshop, 239 had valid, readable addresses, and 99 returned useable surveys, representing a 41 percent response rate.

The surrounding landowners, also surveyed only by mail, were identified through the tax roles. A systematic random sample of 395 names and addresses were selected. From this list, 374 valid and current landowners were identified and sent a survey packet. Following the three-stage survey procedure, this group had a 48 percent response rate, yielding 173 usable surveys.

Overall, the general mail survey (survey mailed without a previous on-site contact) used for the equestrians and landowners had a somewhat lower response rate than the follow-up to the on-site survey. This is typical of general population mail surveys without personal or previous contact.

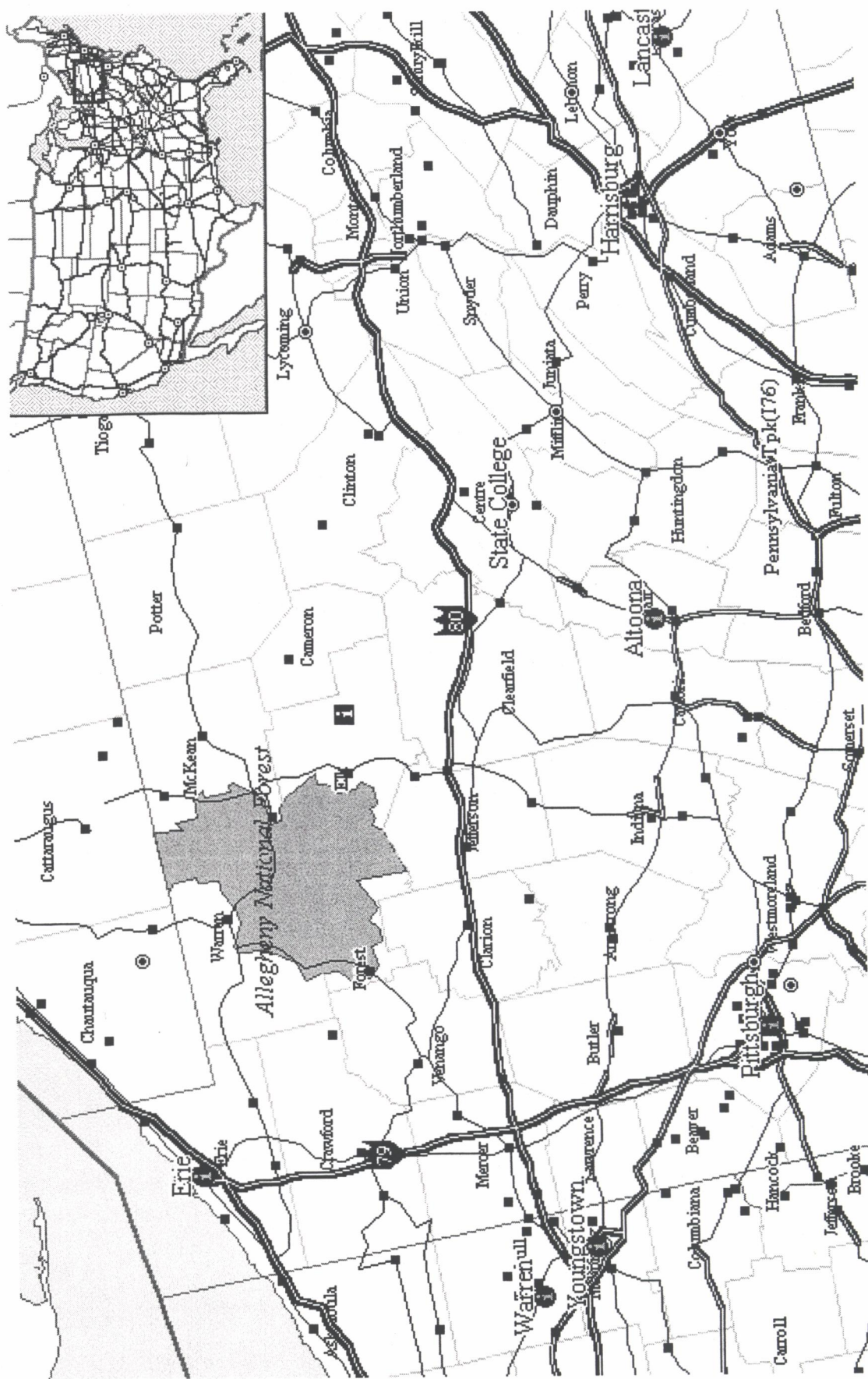


Figure 1: Allegheny National Forest Map

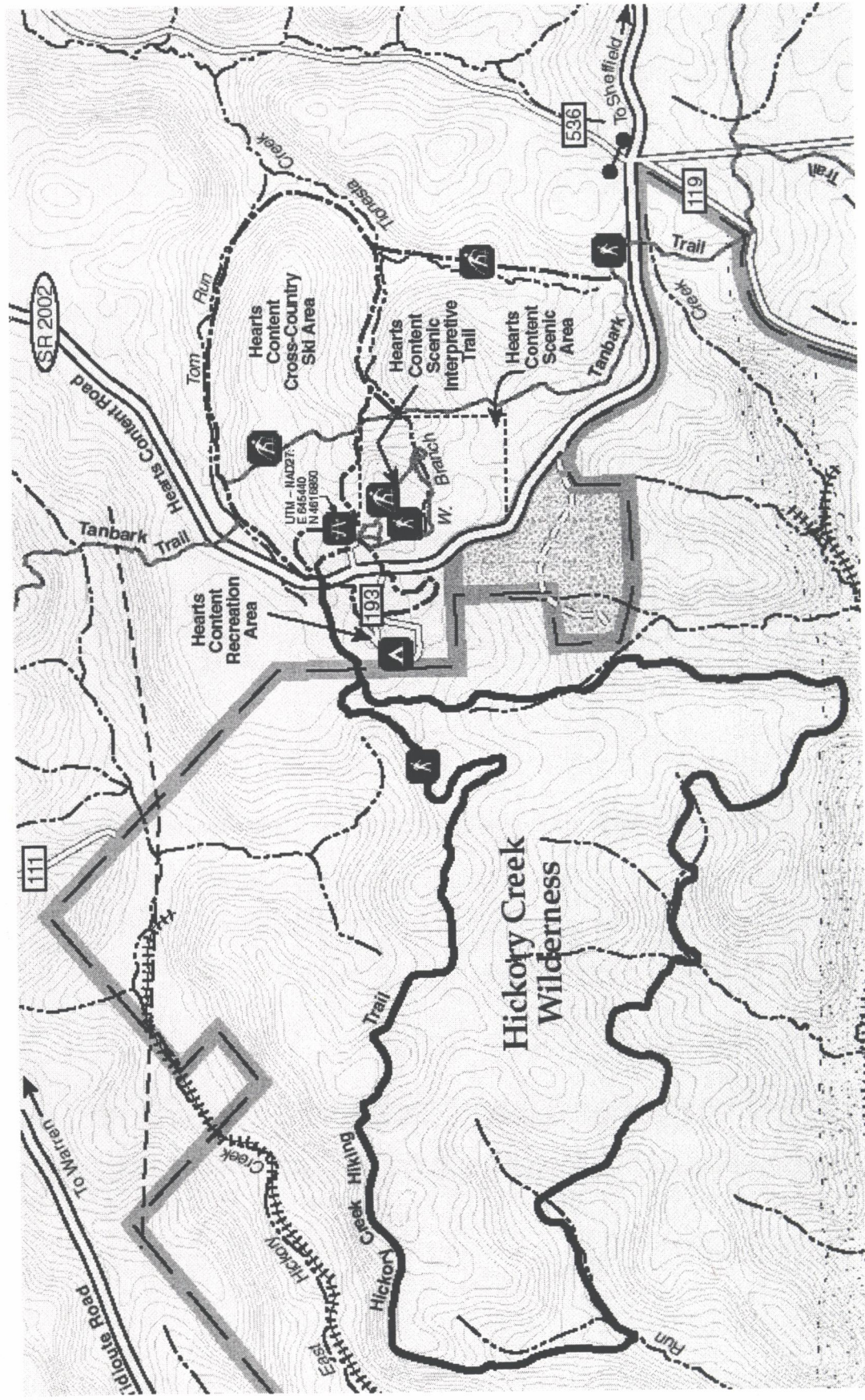


Figure 2: Hearts Content/Hickory Creek Study Site Map

Results

This section reports the results of the survey divided into three sub-sections: 1) respondent profile, 2) information needs and sources, and 3) visitor experience, attitudes and knowledge.

Profile of Respondents

As indicated earlier, the results were analyzed separately for each of the five user groups (Table 2). The total sample of 630 cases was composed of 29 percent Wilderness users ($n = 183$), 10 percent scenic area users ($n = 62$), 17 percent campground users ($n = 108$), 16 percent equestrians ($n = 99$), and 28 percent surrounding landowners ($n = 178$).

Table 2. Respondent User Groups

User Group	n	Percent of Respondents
Wilderness users	183	29%
Scenic area users	62	10%
Campground users	108	17%
Equestrians	99	16%
Surrounding landowners	178	28%
Total	630	100%

The typical respondent to the survey was a married, male, Caucasian in his mid-forties, with one child. He is likely to have completed at least some college, is employed full time outside the home, earning \$35,000 to \$50,000 and having 3.5 weeks of vacation (Table 3). Males comprised about three-quarters of each user group except for horse users, where males and females were almost equally represented. The various user groups also tended to be different ages, with Wilderness users being the youngest and surrounding land owners the oldest (approximately 38 and 52 years of age, respectively). Almost three-quarters of the respondents were married, but Wilderness users and campground users were least likely to be married (63% and 66%, respectively). Although all users reported fairly high levels of education, Wilderness, campground and scenic area users tended to be more educated than horse users and landowners. Income levels of the user groups did not differ significantly from each other.

Table 3. Demographic Profile of Each User Group

Demographic Variable	Wilderness Users	Scenic Area Users	Campground Users	Horse Users	Land-owners	χ^2 or F
Gender						
Male	79%	68%	76%	51%	84%	$\chi^2=38.90^{***}$
Female	21%	32%	24%	49%	17%	
Age						
Mean	(38.6)	(43.8)	(41.4)	(49.1)	(52.3)	$F=35.7^{***}$
<20	4%	0%	0%	0%	0%	$\chi^2=146.62^{***}$
21-30	24%	15%	23%	0%	5%	
31-40	31%	37%	29%	22%	13%	
41-50	26%	23%	27%	34%	28%	
51-60	13%	18%	13%	32%	26%	
61-70	2%	7%	7%	9%	21%	
70+	1%	2%	1%	3%	7%	
Race						
Caucasian	96%	94%	95%	99%	99%	$\chi^2=17.80$
Other	4%	6%	5%	1%	1%	
Marital Status						
Married	63%	81%	66%	77%	79%	$\chi^2=35.4^{***}$
Single	29%	13%	21%	7%	10%	
Divorced	7%	6%	10%	12%	8%	
Widowed	1%	0%	3%	4%	4%	
Children						
0	61%	66%	71%	55%	63%	$\chi^2=20.47$
1	14%	9%	10%	19%	13%	
2	14%	13%	14%	20%	15%	
3	7%	13%	5%	4%	6%	
4+	4%	0%	0%	1%	3%	

Level of significance: *** $p < .001$. ** $p < .01$. * $p < .05$.

Table 3. Demographic Profile of Each User Group (cont.)

Demographic Variable	Wilderness Users	Scenic Area Users	Campground Users	Horse Users	Land-owners	χ^2 or F
Education						
< High School	1%	0%	2%	8%	5%	$\chi^2=83.11^{***}$
High school diploma Attended	15%	13%	25%	33%	33%	
business/technical school	8%	9%	8%	15%	19%	
Some college or 2 year degree	20%	22%	20%	25%	25%	
Completed 4 year college degree	28%	19%	23%	8%	11%	
Some graduate work	9%	19%	8%	8%	3%	
Completed graduate or advanced degree	20%	19%	13%	6%	4%	
Income						
< \$5,000	3%	0%	4%	1%	1%	$\chi^2=29.37$
\$ 5,000 to \$14,999	4%	0%	11%	8%	3%	
\$15,000 to \$24,999	15%	10%	11%	20%	18%	
\$25,000 to \$34,999	10%	13%	15%	14%	14%	
\$35,000 to \$49,999	31%	27%	26%	23%	28%	
\$50,000 to \$74,999	22%	27%	22%	30%	25%	
\$75,000 to \$100,000	6%	13%	9%	2%	5%	
> \$100,000	8%	10%	4%	2%	7%	
Employment						
Employed outside the home	85%	74%	75%	72%	68%	$\chi^2=63.08^{***}$
Unemployed	2%	0%	2%	0%	1%	
Retired	6%	19%	20%	18%	28%	
Full-time homemaker	0%	7%	0%	9%	2%	
Student	7%	0%	3%	1%	1%	
Employment Type						
Full-time	94%	96%	94%	87%	88%	$\chi^2=4.98$
Part-time	6%	5%	7%	13%	12%	
Weeks of Vacation						
Mean	(3.2)	(3.5)	(3.8)	(3.9)	(3.4)	$F=1.57$ $\chi^2=36.45$
0	4%	7%	4%	7%	12%	
1	7%	7%	9%	9%	10%	
2	33%	27%	33%	18%	20%	
3	22%	20%	11%	16%	16%	
4	20%	23%	13%	21%	18%	
5	9%	10%	11%	14%	13%	
6	2%	3%	6%	4%	7%	
7+	4%	3%	15%	11%	5%	
Residential Area During Childhood						
On A Farm or Ranch	12%	9%	19%	44%	17%	$\chi^2=84.2^{***}$
Rural or Small Town	15%	22%	15%	27%	30%	
Town	15%	13%	10%	11%	20%	
Small City	21%	22%	29%	11%	16%	
Medium City	26%	22%	18%	5%	12%	
In A Major City or Metropolitan Area	11%	13%	10%	2%	6%	

Level of significance: *** $p < .001$. ** $p < .01$. * $p < .05$.

There were no significant differences in the sample based on race. Overall, the sample was almost exclusively Caucasian. This is probably due to the distance of the study site from major metropolitan areas and the general prevalence of Caucasian males in most outdoor recreation activities.

There were some differences in the type of area in which respondents grew up. Wilderness, scenic area and campground users tended to be slightly more urban than landowners and horse users. Horse users were most likely to have a rural background, with 44 percent being raised on a farm or ranch and 27 percent growing up in a rural area or small town.

Respondents were asked to indicate what activities they participated in while visiting the area. Overall, almost four-fifths of users reported that viewing scenery was the most popular activity. Other popular activities included hiking/walking (75% participated), camping (60% participated) and backpacking (35% participated).

In general, the user groups studied differed in their activity participation (Table 4). Wilderness users were the most likely to report backpacking (74%), while scenic area users the least likely (5%). Conversely, scenic area users were the most likely group to report day hiking or walking (95%) and horse users the least likely (47%). Camping was the dominant activity of the campground users (95%) while scenic area users (24%) and landowners (26%) reported the lowest levels of participation in camping. Picnicking was fairly high across all groups, with landowners and scenic area users reporting the most participation (40% and 42%, respectively) and equestrians (33%) and Wilderness users (24%) the least.

The equestrians were the only group to report participation in horseback riding in any significant numbers, with 82 percent of equestrian respondents indicating they participate in horseback riding at the Hickory Creek/Hearts Content area. Participation in hunting and fishing were highest for the surrounding landowner group, followed by the horse users. Photography and nature study were popular among all groups but highest among the scenic area users, with half of those respondents reporting participation in each of these activities.

The rest of the activities were participated in by fewer respondents and typically dominated by one or two groups. For example, orienteering was only popular among Wilderness users (21%), while mountain biking was most common to scenic area users

(11%). Driving off-road vehicles was rarely mentioned, except by a minority of horse users (9%) and landowners (8%).

Table 4. Percentage Reporting Participation in Activities, by User Group

Activity	Wilderness Users	Scenic Area Users	Campground Users	Horse Users	Land-owners	χ^2
Hiking/Walking	74%	95%	82%	47%	72%	36.8***
Backpacking	74%	5%	23%	24%	13%	186.9***
Camping	78%	24%	97%	53%	26%	194.5***
Viewing Scenery	86%	81%	79%	56%	77%	20.8***
Picnicking	24%	40%	35%	33%	42%	13.4***
Horseback Riding	4%	2%	1%	82%	8%	272.6***
Hunting	9%	5%	4%	40%	72%	235.3***
Fishing	16%	11%	11%	29%	49%	75.5***
Photography	42%	50%	50%	40%	39%	ns
Nature Study	34%	50%	29%	24%	21%	19.3***
Mountain Biking	6%	11%	7%	4%	9%	ns
Orienteering	21%	7%	6%	7%	8%	22.8***
Jogging/Trail Running	5%	2%	5%	7%	2%	ns
Driving Off-Road Vehicles	2%	2%	2%	9%	8%	12.9*
Other	11%	7%	13%	2%	8%	ns

Level of significance: *** $p < .001$. ** $p < .01$. * $p < .05$.

Participation in various activities is one indicator of activity choice but importance of the activity may better reflect user preferences. Hickory Creek/Hearts Content area users were asked to rank the importance of each activity in which they participate. There were significant differences in activity importance among the groups in all but three activities/categories: mountain biking, jogging/trail running and other activities (Table 5).

Activity importance followed a predictable pattern, with Wilderness users reporting backpacking as more important than any other user group (mean importance rating of 2.3 on a four point scale). Camping was also important to the Wilderness users, receiving a 2.1 average importance rating, followed by day hiking/walking (1.8) and viewing scenery (1.7). Photography and nature study round out the list of moderately important activities for this group. Each received a mean importance rating of 0.5, suggesting these activities are secondary rather than primary activities for Wilderness users.

Scenic area users rated day hiking/walking as their most important activity (3.3) and viewing scenery at 2.2, higher than any other group. Picnicking was rated higher by these users (0.8) than other user groups, but still less than 1.0, suggesting only moderate importance. Other activities rated highest by this group were photography and nature study.

Campground users rated camping as their most important activity (3.4), followed by day hiking/walking (2.3) and viewing scenery (1.5). Campers also reported moderate importance for backpacking (0.8) and photography (0.7), with all other activities considerably less important.

Horse users rated horseback riding as their most important activity (2.8) and camping as their second most important activity (1.4). Although camping appears to be a primary activity for equestrians, it is significantly less important for them than it is for campers (3.4) and Wilderness users (2.1). Other moderately important activities for equestrians include hunting (0.8), photography (0.6) and picnicking (0.5). All of the other activities had lower than a 0.5 mean importance rating.

Surrounding landowners tended to rate most activities as less important, with no single activity showing a mean importance rating of more than 2.0. The single most important activity for landowners was hunting (1.9), followed by day hiking/walking and viewing scenery (both producing a 1.5 activity importance rating). Other moderately important activities included fishing (0.8), picnicking (0.7) and photography (0.5). It is notable that landowners rated both fishing and hunting as far more important than any other user group.

Less important activities that were significantly more important for one or two groups included orienteering and driving off-road vehicles. Wilderness users rated orienteering as significantly more important than other users. Landowners and equestrian users both rated driving off-road vehicles as significantly more important than other users.

Table 5. Activity Importance, by User Group

Activity	Wilderness Users	Scenic Area Users	Campground Users	Horse Users	Land-owners	F
Hiking/Walking	1.79	3.32	2.32	1.02	1.548	28.1***
Backpacking	2.31	0.08	0.76	0.38	0.19	78.2***
Camping	2.11	0.68	3.37	1.36	0.45	113.6***
Viewing Scenery	1.66	2.15	1.47	1.02	1.50	6.7***
Picnicking	0.28	0.82	0.44	0.49	0.66	7.0***
Horseback Riding	0.12	0.02	0.01	2.82	0.19	150.2***
Hunting	0.23	0.08	0.05	0.78	1.92	77.5***
Fishing	0.31	0.19	0.18	0.40	0.84	13.6***
Photography	0.53	0.90	0.66	0.58	0.53	2.9*
Nature Study	0.53	0.74	0.44	0.38	0.35	2.8*
Mountain Biking	0.12	0.27	0.13	0.04	0.13	ns
Orienteering	0.24	0.06	0.06	0.07	0.09	5.9***
Jogging/Trail Running	0.07	0.05	0.05	0.07	0.03	ns
Driving Off-Road Vehicles	0.02	0.05	0.02	0.11	0.13	3.0*
Other	0.19	0.19	0.25	0.09	0.28	ns

Level of significance: *** $p < .001$. ** $p < .01$. * $p < .05$.

The activity importance scale was coded as 1 = participated, but unranked; 2 = third most important activity; 3 = second most important activity; 4 = most important activity.

Respondents were also asked to indicate specific locations within the study area that they visited (Table 6). On-site respondents were asked which areas they visited within their trip, while those sampled only through the mail survey (equestrians and landowners) were asked what they typically do during visits to the Hickory Creek/Hearts Content area. Surprisingly, not all visitors listed the area where they were sampled, suggesting that some visitors lack awareness of the names of the sites within the area. For example, 63 percent of visitors sampled in the Wilderness (either via on-site interview or from the trail register) reported that they visited the Hickory Creek Wilderness. Wilderness users were more likely to report that they used the Hickory Creek Trail (73%) than they were to realize that they were in the Hickory Creek Wilderness Area (63%).

Nearly half of the campground visitors reported using the Hickory Creek Wilderness (46%) and Hickory Creek Trail (46%). This is not surprising given the location of the campground immediately adjacent to the Wilderness area and trailhead. Horse users were least likely to report visiting the Wilderness (21%) or using the Hickory Creek Trail (10%). Only the Wilderness users were likely to report camping in the backcountry (61% versus less than 20% for any other group).

The Hearts Content Scenic Area was a popular destination for all groups. Notably, the majority of surrounding landowners (59%) reported visiting this area. Most of the landowners also used the Hickory Creek Wilderness (54%), although the most popular forest activity for the landowners was driving for pleasure and enjoying the scenery.

Horse users generally were less likely to use any of the areas listed in the survey. One-fourth of them visited the Hearts Content Scenic Area, making it the most visited area of any listed in the survey for the horse users. It appears that the equestrians probably tend to use other areas of the National Forest or surrounding area, rather than the immediate Hickory Creek/Hearts Content area for their activities.

Other trails (e.g. the North Country and Tanbark) were used by a minority of visitors within any of the user groups. The surrounding landowners were more likely than any other group to report use of the Tanbark Trail (40%) and were twice as likely to use the Tanbark as the North Country Trail (20%). Conversely, the Wilderness users were equally likely to use the North Country (28%) and Tanbark (27%) trails.

Table 6. Percentage Reporting Use of Specific Areas, by User Group

Areas Visited	Wilderness Users	Scenic Area Users	Camp-ground Users	Horse Users	Land-owners	χ^2
Hickory Creek Trail	73%	24%	46%	10%	41%	100.0***
Hickory Creek Wilderness Area	63%	33%	46%	21%	54%	48.3***
Camp in backcountry	61%	0%	18%	12%	13%	128.7***
Hearts Content Scenic Area	54%	82%	56%	25%	59%	44.6***
Hearts Content campground	32%	9%	83%	3%	12%	163.9***
Hearts Content picnic area	16%	36%	11%	8%	34%	35.9***
North Country Trail	28%	0%	2%	12%	20%	31.0***
Tanbark Trail	27%	6%	22%	10%	40%	36.9***
Drive for pleasure/ enjoy scenery	32%	55%	48%	18%	71%	85.2***
Other	20%	7%	24%	19%	32%	11.1*

Level of significance: *** $p < .001$. ** $p < .01$. * $p < .05$.

Information Needs and Sources

To ascertain respondents' needs for and preferred sources of information, they were asked a series of questions regarding information and communications. One question dealt with general information use and the sources of information typically consulted when planning for a trip or vacation. The question format asked respondents to rank the importance of various planning information sources.

In general, maps and signs were the most frequently consulted information sources, followed by travel guides and tour books, brochures and pamphlets and visitor centers (Table 7). The least often used sources included TV or radio, newspapers, outdoor clubs, and sporting goods stores. Overall, horse users tended to report the highest levels of information use in planning for trips, followed closely by the adjacent landowners, while campground users tended to have the lowest rates.

There were a number of significant differences when the various user groups were compared with respect to their use of specific sources of information for planning trips and vacations. Horse users and landowners were more likely than the Wilderness or Scenic Area visitors to rely on their own experience or word of mouth sources like friends, relatives or neighbors. The equestrians and landowners were also more likely to use outdoor clubs and organizations and sporting goods stores for information. Wilderness (58%) and campground users (45%), on the other hand, were much more likely than the other groups (20-29%) to use hiking guidebooks.

Table 7. Percentage of Respondents Reporting Use of Each Source of Information, by User Group

Planning Information Sources	Wilderness Users	Scenic Area Users	Camp-ground Users	Horse Users	Land-owners	χ^2
Road/trailhead signs	51%	45%	55%	77%	67%	23.00***
Road/trail map	80%	90%	76%	80%	82%	ns
Live or lived in the area	10%	16%	7%	32%	28%	31.59***
Friends, relatives or neighbors	39%	42%	28%	53%	46%	10.77*
Individual working at destination	14%	16%	12%	30%	25%	14.10**
Visitor center	44%	52%	40%	46%	58%	9.59*
Travel guides/tour books	42%	74%	38%	50%	61%	21.54***
Newspapers	9%	19%	2%	19%	25%	24.44***
Internet/WWW	22%	26%	19%	21%	22%	ns
Brochure/pamphlet	55%	61%	52%	63%	62%	ns
Sporting good store	13%	16%	9%	23%	26%	14.54**
Ranger station	42%	32%	45%	51%	36%	ns
State information center	26%	42%	22%	39%	44%	16.48**
Hiking guide book	58%	29%	45%	20%	27%	48.88***
TV/radio	6%	13%	3%	12%	20%	20.84***
Magazines	16%	23%	28%	21%	24%	ns
Outdoor club/organization	13%	10%	5%	32%	21%	24.07***
Other	5%	3%	5%	13%	6%	ns

Level of significance: *** $p < .001$. ** $p < .01$. * $p < .05$.

Another question asked respondents if they had heard of the Hickory Creek Wilderness and, if so, how they had found out about the Wilderness. Most respondents in all user groups were aware of the Wilderness area, although the percentage ranged from 97 percent of the Wilderness users to 66 percent of the equestrians (Table 8).

Table 8. Awareness of the Hickory Creek Wilderness Area, by User Group

Awareness of Hickory Creek	Wilderness Users	Scenic Area Users	Campground Users	Horse Users	Land-owners	χ^2
Had heard of Wilderness Area	97%	75%	81%	66%	88%	48.59***
Had not heard of Wilderness Area	3%	25%	19%	34%	12%	

Level of significance: *** $p < .001$.

The various user groups learned about the Hickory Creek Wilderness through different sources (Table 9). At least one-third of all groups found out about the Hickory Creek Wilderness through word of mouth sources (i.e., friends, relatives, neighbors). Most adjacent landowners (62%) knew about the Wilderness area by living in the area. Interestingly, nearly half of the Wilderness users (43%) found out about the Wilderness from a hiking book, and another one-third (30%) learned about it from a brochure or pamphlet. Road/trailhead signs were important information sources to landowners (44%) and Wilderness users (25%). Maps were more important to Wilderness users (39%), campers (34%), and landowners (37%) than they were to Scenic Area visitors (22%) or equestrians (16%).

Table 9. Information Sources for the Hickory Creek Wilderness Area, by User Group

Information Sources	Wilderness Users	Scenic Area Users	Camp-ground Users	Horse Users	Land-owners	χ^2
Road/trailhead signs	25%	13%	15%	8%	44%	52.1***
Road/Trail map	39%	22%	34%	16%	37%	18.5**
Live/lived in the area	9%	13%	28%	19%	62%	106.7***
Friends, relatives or neighbors	41%	38%	31%	32%	32%	ns
Individual working at destination	1%	3%	2%	1%	5%	ns
Visitor center	14%	22%	16%	5%	11%	9.0 ⁺
Travel guides/tour books	13%	19%	11%	1%	8%	14.9**
Newspapers	4%	3%	3%	5%	13%	13.3*
Internet/WWW	4%	9%	7%	0%	1%	15.2**
Brochure/pamphlet	30%	16%	19%	12%	23%	12.2*
Sporting good store	7%	0%	5%	3%	12%	10.8*
Ranger station	18%	9%	19%	12%	15%	ns
State information center	6%	0%	7%	1%	7%	ns
Hiking guide book	43%	9%	26%	2%	8%	88.8***
TV/Radio	0%	0%	0%	1%	4%	11.0*
Magazines	6%	3%	5%	0%	6%	ns
Outdoor club/organization	6%	3%	5%	6%	1%	ns
Other	4%	13%	10%	14%	14%	10.5*

Level of significance: *** $p < .001$. ** $p < .01$. * $p < .05$. ⁺ $p = .06$.

Forest users were asked about the importance of various types of information (Table 10). For all of the groups, the most important type of information was a map with locations of trails and area features. All groups also attached high importance to natural history information (or information on the types of plants and animals in the area). Information on rules and regulations was also relatively important, although it was especially important to horse users and landowners. Some types of information were important to only certain groups. For example, information about hunting or fishing in the area was exceptionally important to adjacent landowners, while information about Wilderness history and philosophy was more important for Wilderness users and landowners.

Table 10. Importance Ratings for Various Types of Information, by User Group

Type of Information	Wilderness Users	Scenic Area Users	Camp-ground Users	Horse Users	Land-owners	F
Map of location of trails and features	2.8	2.6	2.5	2.8	2.7	5.89***
Rules and regulations for the area	2.3	2.0	2.0	2.6	2.6	17.09***
Tips on wilderness hiking and camping	1.9	1.5	1.7	1.9	2.1	7.78***
Types of plants and animals in the area	2.2	2.3	2.2	2.1	2.3	ns
Hunting or fishing in the area	1.7	1.5	1.7	2.0	2.7	52.58***
Wilderness safety	2.0	1.6	1.9	2.1	2.2	8.18***
Wilderness history and philosophy	2.1	1.7	1.8	1.8	2.1	6.61***
General forest information	2.3	--	--	2.1	2.1	ns
Places similar to this area	2.2	1.9	1.8	2.1	1.9	6.83***
Other	2.4	2.5	2.4	2.4	1.4	3.49*

Response scale: 1 = Not important to 3 = Very important.

Level of significance: *** $p < .001$. ** $p < .01$. * $p < .05$.

Table 11 shows the typical number of different information sources used by forest users to obtain different types of information. Generally, maps were sought from more different sources than other types of information. Wilderness users, horse users and landowners obtained maps from three or more different sources. Campground users tended to use the fewest sources across all of the types of information.

Table 11. Average Number of Places to Get Each Type of Information, by User Group

Type of Information	Wilderness Users	Scenic Area Users	Camp-ground Users	Horse Users	Land-owners	F
Map of location of trails and features	3.1	2.0	1.5	3.4	3.0	17.34***
Rules and regulations for the area	2.4	1.7	1.3	2.6	2.2	6.23***
Tips on wilderness hiking and camping	2.2	1.7	1.3	2.0	1.8	2.90*
Types of plants and animals in the area	2.3	1.6	1.2	1.9	1.9	4.18**
Hunting or fishing in the area	1.9	1.2	1.2	1.9	2.5	6.72***
Wilderness safety	1.9	1.2	1.3	1.9	1.8	2.38 ⁺
Wilderness history and philosophy	2.0	1.6	1.2	1.8	1.7	ns
General forest information	2.2	1.7	1.4	2.1	1.8	2.51*
Places similar to this area	2.3	1.8	1.2	1.9	1.4	5.72***
Other	0.1	0.2	0.1	0.1	0.1	ns

Level of significance: *** $p < .001$. ** $p < .01$. * $p < .05$. ⁺ $p = .05$.

Table 12 presents the average number of different types of information sought from different sources. Ranger stations seem to be a source of many types of information, with all groups reporting that they seek an average of 4-5 types of information at ranger stations. In contrast, newspapers and sporting goods stores are typically used for only one or two types of information. Wilderness users and landowners again stood out by seeking more types of information from brochures, while newspapers provided the fewest types of information across all user groups.

Table 12. Average Number of Types of Information Sought from Each Information Source, by Group Type

Type of Information	Wilderness Users	Scenic Area Users	Camp-ground Users	Horse Users	Land-owners	F
Sporting Goods Stores	1.6	0.7	0.6	1.7	1.8	4.00**
Newspapers	1.0	0.7	0.2	0.8	1.1	ns
Books & Magazines	2.6	2.0	1.8	1.4	1.8	3.14*
Brochures	4.2	3.0	1.5	3.9	4.3	9.70***
Trailhead Signs	2.6	1.4	1.0	2.9	2.4	6.39***
Ranger Patrol	1.7	1.2	1.0	2.4	2.0	3.04*
Ranger Station	4.5	4.4	4.4	5.3	3.8	2.75*
Internet	2.1	1.3	1.2	1.4	1.1	2.45*

Level of significance: *** $p < .001$. ** $p < .01$. * $p < .05$.

Timing of information provision is another important consideration (Table 13). Visitors show distinct preferences for obtaining various types of information at different times or stages of their visit. These questions were asked only of the three user groups included in the on-site survey. Most forest users prefer to have maps of the area before making their trip. Likewise, those wanting tips on wilderness hiking and camping desire this information before their trip rather than after arriving at the site. Visitors were more evenly divided on whether they would prefer to get information about plants and animals in the area before their trip or at the recreation area. Not surprisingly, those who want information about hunting and fishing opportunities would generally like this information before their trip to the area.

Table 13. Preferred Timing of Information, by User Group (On-site Survey Only)

Type of Information	User Group	Preferred Time/Place to get Information				χ^2
		Not at All	Before the Trip	At the Area	Both Places	
Map of location of trails and features	Wilderness	2%	60%	10%	28%	16.82**
	Scenic Area	8%	48%	24%	19%	
	Campground	9%	51%	25%	15%	
Rules and regulations	Wilderness	14%	46%	28%	12%	ns
	Scenic Area	23%	36%	31%	13%	
	Campground	26%	35%	28%	11%	
Tips on wilderness hiking and camping	Wilderness	33%	38%	16%	13%	ns
	Scenic Area	53%	31%	7%	10%	
	Campground	45%	39%	10%	6%	
Types of plants and animals in the area	Wilderness	15%	41%	33%	11%	ns
	Scenic Area	15%	39%	34%	13%	
	Campground	20%	47%	22%	12%	
Hunting or fishing in the area	Wilderness	67%	27%	0%	7%	ns
	Scenic Area	63%	19%	8%	10%	
	Campground	56%	34%	4%	7%	
Wilderness safety	Wilderness	27%	38%	19%	16%	16.78**
	Scenic Area	50%	21%	15%	15%	
	Campground	32%	44%	18%	7%	
Wilderness history and philosophy	Wilderness	29%	33%	26%	12%	ns
	Scenic Area	42%	21%	24%	13%	
	Campground	37%	30%	26%	7%	
Places similar to this area	Wilderness	16%	39%	25%	20%	28.49***
	Scenic Area	31%	36%	23%	11%	
	Campground	43%	43%	10%	5%	
Other	Wilderness	47%	20%	16%	16%	ns
	Scenic Area	56%	8%	16%	20%	
	Campground	38%	13%	38%	13%	

Level of significance: *** $p < .001$. ** $p < .01$.

Table 14 summarizes visitor responses to questions about the bulletin board displays at the study area. These questions also were asked only of the three user groups included in the on-site survey. The majority of visitors (64-80%) reported that they noticed the bulletin board and found it useful. Very few (0-2%) indicated that the information provided was too complex. A notable minority of Scenic Area visitors (18%) agreed that the bulletin board contained good ideas, but that it was too late in their trip for them to be able to follow them. This is the only item among these questions that differed significantly across the three user groups in the on-site survey.

Table 14. Response to Information Presented on Trailhead Bulletin Board, by User Group (On-site Survey Only)

Visitor Response*	Percent of Respondents Agreeing With Statement			
	Wilderness	Scenic Area Users	Campground	F.
I did not see the bulletin board.	4%	9%	12%	ns
I saw the bulletin board but I did not stop to read it.	9%	12%	9%	ns
I saw and read the bulletin board and found it useful.	80%	64%	74%	ns
I read it, but I found the information too complex for me.	2%	0%	2%	ns
The ideas suggested on the bulletin board were good ones, but it was too late in my trip to follow most of the suggestions.	4%	18%	7%	5.9*
There was too much information on the bulletin board for me to find useful suggestions.	0%	0%	2%	ns
The same information was on the bulletin board as I found on my last trip here.	9%	12%	9%	ns

Level of significance: * $p = .05$.

A final information-related question asked respondents about the magazines they read (Table 15). Magazine readership patterns differed among user groups. Wilderness users were far more likely than the other groups to report reading non-consumptive outdoor recreation publications. Landowners were particularly likely to read consumptive-oriented magazines, reflecting their interest and participation in hunting and fishing activities. A more detailed analysis of the magazine readership data is provided in Confer, Mowen, Graefe and Absher (2000).

Table 15. Type of Magazine Usually Read, by User Group

Magazine Category label	Wilderness Users	Scenic Area Users	Camp-ground Users	Horse Users	Land-owners
Outdoor Rec: Non-Consumptive/Non-Motorized	53%	5%	16%	3%	23%
Outdoor Rec: Consumptive/Motorized	15%	2%	9%	12%	61%
Environ/Conserv/Science/Travel/Ecology	39%	19%	10%	8%	23%
General Rec/Fitness/Hobbies/Crafts/Sports	29%	8%	15%	9%	39%
General News/Business/Investment/Computer	34%	9%	11%	13%	33%
Home/Women's/Cooking/Food/Domestic	21%	8%	6%	24%	41%
General Interest/Entertainment	22%	8%	16%	15%	39%
Equine Sports	4%	0%	1%	84%	11%
Other/Unknown	20%	5%	5%	26%	44%

Visitor Experience, Attitudes and Knowledge

Trip Planning

In order to ascertain how far in advance visitors might need information to assist them in planning for their visit to the Hickory Creek/Hearts Content Area, visitors were asked about their planning behavior. Since only those visitors contacted on-site were asked this question, the number of respondents is lower and two of the user groups (horse users and landowners) are not represented in the analysis. Planning behavior varied significantly for the different user groups (Table 16). Scenic area visitors were more likely to be on a "spur of the moment" trip in which they decided to make the visit that same day (26% versus 6-7% of campers and wilderness users), whereas campers and wilderness users were most likely to plan their trip from one week to three months prior to their visit. Relatively few people within any of the groups planned their trip more than three months ahead.

Table 16. When Respondents Made the Decision to Visit Hickory Creek/Hearts Content Area, by User Group (On-site Survey Only)

When Decided to Visit	Wilderness Users	Scenic Area Users	Campground Users
Today	6%	26%	7%
Day before trip	12%	15%	11%
Week before trip	36%	21%	35%
2-4 weeks before trip	20%	11%	18%
1-3 months before trip	20%	18%	25%
> 3 months before trip	6%	10%	5%

Level of significance, $p=0.007$; χ^2 -Statistic=24.06; $n = 232$.

Visitor Experience

To determine experience levels and frequency of use, respondents were asked a series of questions to develop an experience use profile. Since some of the respondents were contacted only by mail survey, it was necessary to first determine if they knew of the area and if they had ever visited it. Although nearly all respondents had heard of the Allegheny National Forest, not all of them had heard of the Hickory Creek Wilderness Area (Table 17). The vast majority (91-100%) of all groups, except equestrians (47%), reported that they had visited either the Hickory Creek Wilderness Area or Hearts Content Recreation Area. Of those respondents contacted on-site, 38-50 percent indicated this was their first visit to the area. The average number of visits to the area during the previous year was about one and one-half visits. Respondents tended to have a very long association with the area, with adjacent landowners and horse users reporting the most years of experience at the area. Across the various user groups, horse users tended to have the least familiarity and experience with the immediate Hickory Creek/Hearts Content area (only 66 percent had heard of HCWA and less than half reported having visited). However, those that had visited tended to have a long association with the area, with the average being just over 18 years. Adjacent landowners reported the most days visiting the Forest during the past year (mean = 25.2), followed by horse users (mean = 8.3), wilderness users (mean = 6.7) and campground users (mean = 6.3). Scenic area visitors were the "least frequent visitors," with just 1.9 days during the past 12 months.

Table 17. Average Experience, by User Group

Experience Variable	Wilderness Users	Scenic Area Users	Campground Users	Horse Users	Land-owners	χ^2 or F
Have you heard of Hickory Creek Wilderness Area?	97%	75%	81%	66%	88%	48.59***
Have you ever visited the Hickory Creek/Hearts Content Area?	99%	100%	100%	47%	91%	213.7***
Is this your first visit?	39%	50%	38%	--	--	2.65
How many trips here last year?	1.4	1.1	1.7	--	--	1.08
How long ago was your first visit?	8.3	9.9	9.9	18.1	27.9	46.17***
Number of days visited here each season in last 12 months:						
Spring	1.4	0.1	1.1	1.1	6.0	15.58***
Summer	3.0	1.6	3.2	3.3	7.6	14.03***
Fall	1.7	0.2	1.4	2.7	8.3	21.51***
Winter	0.6	0.0	0.6	1.2	5.1	14.12***
Total	6.7	1.9	6.3	8.3	25.2	23.75***

Level of significance: *** $p < .001$.

Visitor Motivations

To determine the motivations for visiting the Hickory Creek area, respondents were asked to respond to a series of potential reasons for visiting the area. Motivation was operationalized using 15-items measured on a 5-point Likert type scale ranging from 1=not at all important to 5=extremely important (Table 18). The items employed were based on the recreation motivation literature. In general, "to enjoy the sights, sounds and smells of nature;" "to observe the beauty of nature;" and "to get away from the everyday routine of life" were the most important motives for all users. Conversely, "to meet friendly people;" "to do things with other people;" and "to be with people with similar interests" tended to be the least important motives.

There were a number of significant differences across the user groups. For example Wilderness users tended to rate "to be alone" and "opportunities to challenge myself" higher than other groups, while rating "to meet friendly people" and "to learn about the countryside" significantly lower. Horse users rated "to be with people with similar interests" and "it is close to my home and easy to get to" as more important than others and "to develop my knowledge" and "to observe the beauty of nature" as motives of lesser importance to them. Campground users tended to rate most of the motives highly and were higher than the other user groups on items such as "to relieve tension," "to get away from other people," "opportunities to challenge myself" and "to meet friendly people."

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Is this your first visit?	39%	50%	38%	--	--	2.65
How many trips here last year?	1.4	1.1	1.7	--	--	1.08
How long ago was your first visit?	8.3	9.9	9.9	18.1	27.9	46.17***
Number of days visited here each season in last 12 months:						
Spring	1.4	0.1	1.1	1.1	6.0	15.58***
Summer	3.0	1.6	3.2	3.3	7.6	14.03***
Fall	1.7	0.2	1.4	2.7	8.3	21.51***
Winter	0.6	0.0	0.6	1.2	5.1	14.12***
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Scenic area users tended to rate the motives higher than the other groups or significantly lower. Motives that were rated highest by these users were "to enjoy the sights, sounds and smells of nature," "to observe the beauty of nature," "to learn about the countryside," and "to develop my knowledge." Those rated lower than other users included "it is close to my home and easy to get to," "to be with people of similar interests," "opportunities to challenge myself," "to get away from other people," "to be alone" and "to relieve tension." Finally, surrounding landowners tended to rate most of the motives lower than the other groups. However, the motive, "it is close to my home and easy to get to" was rated highest by the adjacent landowners and equestrians.

Table 18. Average Importance of Motives, by User Group

Motives	Wilderness Users	Scenic Area Users	Camp-ground Users	Horse Users	Land-owners	F
To develop my knowledge	3.0	3.5	3.1	2.8	2.9	2.83*
To be alone	4.1	3.3	3.9	3.5	3.5	5.86***
To observe the beauty of nature	4.6	4.7	4.6	4.4	4.4	3.03*
To have fun	4.2	3.9	4.3	4.1	4.1	ns
To relieve tension	4.0	3.6	4.3	3.9	4.0	3.30*
To meet friendly people	1.9	2.4	2.7	2.6	2.4	10.65***
To learn about the countryside	3.1	3.8	3.6	3.2	3.3	4.78**
To get away from other people	4.1	3.3	4.2	3.6	3.7	9.00***
To enjoy the sights, sounds and smells of nature	4.7	4.8	4.7	4.5	4.4	3.23***
To do things with other people	2.4	2.4	2.1	2.3	2.5	ns
To have a good time	4.0	4.1	4.3	4.1	3.9	ns
To get away from the everyday routine of life	4.4	4.3	4.6	4.3	4.3	ns
To be with people of similar interests	2.6	2.5	2.6	3.2	2.8	2.25 ⁺
It is close to my home and easy to get to	2.6	2.3	2.8	3.1	3.1	3.88**
Opportunities to challenge myself	3.3	2.7	3.2	3.2	2.7	4.24**

Level of significance: *** $p < .001$. ** $p < .01$. * $p < .05$. ⁺ $p = .06$.

In order to further explore the underlying dimensions of user motivations, a principal axis factor analysis with varimax rotation was employed. Based on the analysis, 5 factors (social, escape, fun, nature and learning) were generated, explaining 57.5 percent of the total variance. Two items failed to load clearly on any single factor and were retained as single item dimensions (close to home and challenge). The social dimension had 3 items

($\alpha=.80$); escape had 4 items ($\alpha=.76$); fun had 2 items ($\alpha=.80$); nature had 2 items ($\alpha=.81$); and learning had 2 items ($\alpha=.75$). Overall, the five factors showed high reliability (Cronbach alpha) and were consistent with the literature. Following the reliability analysis, the mean values of the items within each factor were computed to create a single composite index score for each factor. The five factors along with their factor loadings and eigenvalues are illustrated in Table 19.

Table 19. Factor Loadings for Allegheny National Forest Visitors

Questionnaire Statement ¹	Factor 1 Social	Factor 2 Escape	Factor 3 Fun	Factor 4 Nature	Factor 5 Learning
To be with people of similar interests	.855				
To do things with other people	.750				
To meet friendly people	.634				
To get away from other people		.857			
To be alone		.742			
To relieve tension		.455			
To get away from the everyday routine of life		.364			
To have fun			.793		
To have a good time			.760		
To observe the beauty of nature				.696	
To enjoy the sights, sounds and smells of nature				.904	
To develop my knowledge					.785
To learn about the countryside					.666
Opportunities to challenge myself	.165	.360	.101	.016	.401
It is close to my home and easy to get to	.245	.116	.087	-.047	.214
# of Items	3	4	2	2	2
Alpha	.80	.76	.80	.81	.74
Eigenvalue	4.27	2.54	1.40	1.23	1.01
Mean Importance	2.49	4.56	3.14	4.00	4.09
% Variance Explained	28.48%	16.95%	9.37%	8.17%	6.71%

Response scale: 1 = Not at all Important to 5 = Extremely Important.

Comparing the five user groups (Wilderness, scenic area, campground, horse users and landowners), five of the seven motivational constructs showed significant differences (Table 18). Only the social and fun dimensions did not differ across groups. Based on the mean values (a higher value indicates more importance of the motivation items), for the nature dimension, scenic area users (mean=4.77) were most likely to indicate high importance, followed by wilderness users (mean=4.67), campground users (mean=4.64), horse users (mean=4.47) and finally the land owners (mean=4.39). Similarly, the learning

dimension was most important to scenic users, followed by campground users, wilderness users, landowners and horse users.

Campground users attributed the most importance towards the escape dimension followed by wilderness users, landowners, horse users, and scenic area users. However, landowners also indicated the most importance for the motivation item, close to home, followed by horse users, campground users, wilderness users and finally, the scenic area users. The final significant item, challenge, was considered most important by wilderness users, followed closely by horse and campground users, and then landowner and scenic area users (Table 20).

Table 20. Comparison of Motivation Dimensions, by User Group

Motivations	Wilderness Users	Scenic Area Users	Camp-ground Users	Horse User	Land owners	F
Nature Index ¹	4.67	4.77	4.65	4.48	4.39	6.00***
Learning Index ¹	3.06	3.7	3.33	3.00	3.05	3.61**
Escape Index ¹	4.16	3.65	4.26	3.83	3.88	5.67***
Close to home ²	2.60	2.31	2.77	3.07	3.10	3.89**
Challenge ²	3.29	2.68	3.19	3.2	2.73	4.24**

Level of significance: *** $p < .001$. ** $p < .01$.

¹Index

²Single Item

Place Attachment

To measure place attachment, respondents were asked to respond to ten items measuring their feelings for this area. These items, designed to tap into the multi-dimensional nature of the place attachment concept, were based on studies by Moore and Graefe (1994) and Williams, Patterson, Roggenbuck and Watson (1992). The ten statements used in this study (Table 21) are a reduced set of the fifteen original items. The original item pool was condensed to reduce the survey burden on respondents. The particular items were chosen to represent two dimensions of place attachment: place dependency and place identity. Additionally, one negatively worded item was included to represent a possible third dimension, "place indifference."

Table 21. Place Attachment Statements

Statement
This area means a lot to me.
I enjoy doing the types of things I do in this area more than in any other area.
I am very attached to this area.
I get more satisfaction out of visiting this area than from visiting anywhere else.
I feel no commitment to this area.
The things I do here I would enjoy just as much at another site.
I find that a lot of my life is organized around this area.
No other place can compare to this area.
One of the major reasons I now live where I do is because of this area.
This area is the best place for the kind of recreation I like to do.

Overall, visitors tended to report fairly high levels of attachment to the study area. As was expected, visitors most often agreed with the statement "This area means a lot to me," with 86 percent agreeing or strongly agreeing with the statement. Other items demonstrating high levels of place attachment among visitors were "I enjoy doing the types of things I do in this area more than in any other area" (55% agreed), "I am very attached to this area" (67% agreed), and "This area is the best place for the kind of recreation I like to do" (46% agreed). The fifth item, "I feel no commitment to this area," although it is negatively worded, also indicated a high level of attachment, with 74 percent of respondents disagreeing or strongly disagreeing with the statement.

To affirm the multi-dimensional nature of the attachment scale, the ten items were factor analyzed using a principal-components procedure with varimax rotation. This analysis revealed a two-factor solution accounting for 63.4 percent of the variance in the original ten items (Tables 22 and 23). The two-factor solution, for the most part, concurs with past research results. An average index was developed for each of two sub-dimensions, place dependence and place identity.

Table 22. Factor Analysis Statistics for Attachment Items

Attachment Item	Factor 1	Factor 2
<i>Factor 1 – Place Dependence</i>		
One of the major reasons I now live where I do is because of this area.	.830	
I find that a lot of my life is organized around this area.	.828	
No other place can compare to this area	.787	
This area is the best place for the kind of recreation I like to do.	.648	.490
I get more satisfaction out of visiting this area than from visiting anywhere else.	.610	.545
<i>Factor 2 - Place Identity</i>		
I am very attached to this area.		.786
This area means a lot to me.		.767
I feel no commitment to this area.		.747
I enjoy doing the types of things I do in this area more than in any other area.	.511	.657
<i>Place Indifference</i>		
The things I do here I would enjoy just as much at another site.		

Table 23. Summary Statistics for Attachment Factors

Factor	Eigenvalue	% of Variance	Cumulative %
1	5.08	50.8%	50.8%
2	1.26	12.6%	63.4%

The place attachment indices were analyzed to determine the reliability of each sub-dimension as well as the overall place attachment scale (Tables 24 through 27). Cronbach's α (alpha) was calculated as a measure of reliability and internal consistency, based on the average inter-item correlation among the items. All attachment indices showed high reliability. The full place attachment index had a reliability of $\alpha = 0.89$, while place dependence had a reliability of $\alpha = 0.86$ and place identity had a reliability of $\alpha = 0.80$.

Table 24. Place Attachment Index Reliability Statistics

Item	Corrected Item-Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
This area means a lot to me.	0.561	0.495	0.878
I enjoy doing the types of things I do in this area more than in any other area.	0.736	0.639	0.866
I am very attached to this area.	0.720	0.671	0.867
I get more satisfaction out of visiting this area than from visiting anywhere else.	0.739	0.606	0.865
I feel no commitment to this area.*	0.396	0.334	0.889
The things I do here I would enjoy just as much at another site.*	0.423	0.298	0.887
I find that a lot of my life is organized around this area.	0.680	0.580	0.869
No other place can compare to this area.	0.707	0.572	0.867
One of the major reasons I now live where I do is because of this area.	0.504	0.445	0.883
This area is the best place for the kind of recreation I like to do.	0.739	0.559	0.865

Reliability Coefficients: 10 items; Alpha = 0.89

*variable reverse coded prior to analysis

Table 25. Place Dependence Index Reliability Statistics

Item	Corrected Item-Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
I get more satisfaction out of visiting this area than from visiting anywhere else.	0.669	0.512	0.840
I find that a lot of my life is organized around this area.	0.735	0.555	0.822
No other place can compare to this area.	0.737	0.551	0.821
One of the major reasons I now live where I do is because of this area.	0.599	0.432	0.858
This area is the best place for the kind of recreation I like to do.	0.688	0.506	0.834

Reliability Coefficients: 5 items; Alpha = 0.86

Table 26. Place Identity Index Reliability Statistics

Place Identity Statement	Corrected Item-Total Correlation	Squared Multiple Correlation	Alpha if Item Deleted
This area means a lot to me.	0.670	0.486	0.727
I enjoy doing the types of things I do in this area more than in any other area.	0.641	0.517	0.741
I am very attached to this area.	0.770	0.633	0.673
I feel no commitment to this area.*	0.410	0.191	0.805

Reliability Coefficients: 4 items; Alpha = 0.80

*variable reverse coded for analysis

Table 27. Summary of Attachment Indices, Mean Scores and Index Reliability

Attachment Index	# of Items	Mean Score	Alpha
Place Attachment	10	3.4	0.89
<i>Sub-Dimensions</i>			
Place Dependence	5	4.0	0.87
Place Identity	4	3.0	0.80
Place Indifference	1		

In order to ascertain if there were significant differences in place attachment between the types of users, a comparative analysis was performed across user groups. Surrounding landowners reported the highest levels of attachment. Horse users also reported fairly high levels of attachment, followed by wilderness users, campground users and lastly scenic area users (Table 28).

Table 28. Respondents' Level of Attachment, by User Group

Statement	Wilderness Users	Scenic Area Users	Camp-ground Users	Horse Users	Land-owners	F
Place Attachment Index (overall)	3.2	2.9	3.0	3.4	3.8	27.47***
Place Identity Index	3.9	3.6	3.5	4.0	4.3	17.05***
Place Dependence Index	2.8	2.4	2.7	3.0	3.6	29.89***
Place Indifference Item	3.1	3.0	3.1	3.2	3.4	2.69*
Attachment items						
This area means a lot to me.	4.3	4.0	3.8	4.4	4.7	12.66***
I enjoy doing the types of things I do in this area more than in any other area.	3.5	3.3	3.2	3.7	4.1	17.01***
I am very attached to this area.	3.7	3.5	3.4	3.9	4.3	14.61***
I get more satisfaction out of visiting this area than from visiting anywhere else.	3.1	3.7	2.9	3.1	3.8	17.52***
I feel no commitment to this area.	2.0	2.4	2.3	2.1	1.9	2.78*
The things I do here I would enjoy just as much at another site.	4.0	3.0	3.0	2.8	2.6	2.69*
I find that a lot of my life is organized around this area.	2.5	2.1	2.4	2.9	3.5	28.73***
No other place can compare to this area.	2.8	2.5	2.6	2.9	3.4	10.18***
One of the major reasons I now live where I do is because of this area.	2.1	1.7	2.1	2.7	3.2	29.54***
This area is the best place for the kind of recreation I like to do.	3.2	2.9	3.0	3.4	3.9	13.81***

Level of significance: *** $p < .001$. ** $p < .01$. * $p < .05$.

The results of this analysis add to the growing understanding of sense of place and place attachment. For the most part the results support previous research findings. The factor analysis found two underlying dimensions, even with a reduced set of items. This result supports previous researchers' conclusions that place attachment is a multi-dimensional construct (Williams, et al. 1992; Moore & Graefe 1994). These sub-dimensions and the overall scale all had very high internal reliability, suggesting that the survey items are tapping into a specific idea (Confer, Graefe, Absher & Thapa 2000).

The differences across user groups also presented few surprises. Surrounding landowners have much more invested in the area and are the most attached. Scenic area users tended to be day users with less contact with the area and therefore reported lower levels of attachment. It was expected that Wilderness users would be more dependent on the

resource due to the scarcity of designated Wilderness in the region. The relatively high place attachment reported by the campers suggests a high loyalty among this particular user group to the Hickory Creek campground.

User Satisfaction

Visitors in the on-site survey were asked how satisfied they were on their visit to the National Forest. There were no significant differences across the user groups in the perceived quality of their experience on the day they were surveyed (Table 29). Most respondents indicated a relatively high degree of satisfaction with their visit.

Table 29. User Satisfaction With Recreation Experience (On-site Survey Only)

Quality Rating	Wilderness Users	Scenic Area Users	Campground Users
1	1%	0%	0%
2	0%	0%	0%
3	0%	0%	0%
4	0%	0%	1%
5	1%	2%	1%
6	1%	2%	3%
7	10%	12%	14%
8	28%	25%	14%
9	29%	28%	35%
10	31%	33%	33%
Mean	8.68	8.74	8.74
Std. Dev	1.35	1.18	1.27

Response scale: 1 = Least satisfied to 10 = Most satisfied; n=271

Customer Service

All groups were asked to rate the importance and performance of a series of site attributes at the National Forest. The list of attributes was patterned after previous studies and represented four domains of customer service: information, services, facilities, and recreation experience. The importance of many of the items varied across user groups (Table 30). For the information attributes, Scenic Area users tended to report the highest importance values. Horse users attached the least importance to nature/historical information.

Table 30. Importance of Site Attributes, by User Group

Site Attributes	Wilderness Users	Scenic Area Users	Camp-ground Users	Horse Users	Land-owners	F-test Signif.
Information Attributes						
Current and accurate information	3.9	4.0	4.1	3.7	3.7	0.001
General information about the area	3.7	3.7	3.7	3.6	3.6	ns
Ease of obtaining information	3.6	3.7	3.6	3.4	3.4	ns
Nature/historical information	3.4	3.7	3.6	3.0	3.6	<.001
Safety information	3.1	3.3	3.3	3.0	3.2	ns
Service Attributes						
Courteous and friendly staff	3.6	3.8	3.9	3.6	3.6	ns
Adequate ranger patrols	3.3	3.6	3.7	3.2	3.4	0.005
The opportunity to offer suggestions to the staff	2.9	2.9	3.4	3.2	3.1	0.014
Availability of staff to answer questions	2.5	2.6	3.1	2.7	2.7	<.001
Visibility of staff	2.3	2.5	2.8	2.4	2.6	0.003
Experience Attributes						
Opportunity to recreate without feeling crowded	4.7	4.4	4.6	4.2	4.1	<.001
Places to recreate without conflict	4.5	4.2	4.4	4.1	4.2	0.001
Opportunity to recreate without interference from other visitors	4.5	4.2	4.3	4.0	4.0	<.001
Compatibility of recreation activities	3.4	3.6	3.5	3.4	3.6	ns
Facilities Attributes						
Appearance and maintenance of area	3.9	4.4	4.2	3.6	4.0	<.001
Safety and security at the area	3.7	3.9	4.1	3.6	3.8	0.005
Value for fee paid	3.7	3.6	3.9	4.0	3.9	0.024
Availability of parking spaces	3.2	3.3	3.1	4.1	3.4	<.001
Accessibility for those with disabilities	2.1	2.7	2.0	2.6	2.9	<.001

Response scale: 1 = Not at all important to 5 = Extremely important.

Wilderness users tended to give staff services the lowest importance ratings, while campground users rated staff services the highest. All groups reported high importance to the experience attributes, although horse users and landowners showed lower importance for opportunities to escape crowding and conflict with other users. As expected, Wilderness users attached the least importance to the facilities attributes.

Nearly all of the same items differed across user groups in terms of performance or satisfaction ratings (Table 31). For all domains, Scenic area and campground users tended to give the highest satisfaction ratings, and horse users and landowners the lowest, with Wilderness visitors in between.

Table 31. Performance of Site Attributes, by User Group

Site Attributes	Wilderness Users	Scenic Area Users	Camp-ground Users	Horse Users	Land-owners	F-test Signif.
Information Attributes						
Current and accurate information	3.4	3.6	3.6	3.1	3.1	0.001
General information about the area	3.6	4.0	3.6	3.1	3.3	<.001
Ease of obtaining information	3.4	3.6	3.8	3.1	3.1	<.001
Nature/historical information	3.4	3.7	3.4	3.2	3.1	0.032
Safety information	3.4	3.7	3.4	3.3	3.1	0.027
Services Attributes						
Courteous and friendly staff	3.7	4.2	4.1	3.3	3.2	<.001
Adequate ranger patrols	3.3	3.1	3.3	3.0	3.0	ns
The opportunity to offer suggestions to the staff	3.3	3.7	3.4	3.0	2.8	<.001
Availability of staff to answer questions	3.4	3.5	3.8	2.8	2.8	<.001
Visibility of staff	3.4	3.3	3.5	3.9	3.0	0.001
Experience Attributes						
Opportunity to recreate without feeling crowded	4.0	4.2	4.0	3.5	3.6	0.001
Places to recreate without conflict	3.9	4.0	4.0	3.5	3.5	0.002
Opportunity to recreate without interference from other visitors	3.9	4.2	3.9	3.2	3.6	<.001
Compatibility of recreation activities	3.6	3.9	3.9	3.2	3.3	<.001
Facilities Attributes						
Appearance and maintenance of area	4.0	4.2	4.5	3.6	3.6	<.001
Value for fee paid	4.1	4.6	4.3	3.2	3.4	<.001
Safety and security at the area	3.6	3.8	3.9	3.3	3.2	<.001
Availability of parking spaces	4.0	4.4	4.2	3.1	3.5	<.001
Accessibility for those with disabilities	3.4	3.5	3.6	3.1	3.1	0.003

Response scale: 1 = Not at all satisfied to 5 = Extremely satisfied.

All groups of forest users were asked how they felt about a series of possible management actions for the Wilderness area. The groups differed in their response to most of the management options (Table 32). Several patterns were evident in the responses. Horse users and landowners generally were less supportive of restrictive practices (e.g. prohibiting radios/cell phones, restricting the number of users, prohibiting horses/pack stock). Scenic area users showed the most support for building more trails and increasing backcountry patrols. Again, Wilderness users showed the least support for facilities development options. Not surprisingly, horse users stood out from the other groups in their support for more equestrian facilities.

Table 32. Percentage of Respondents Favoring Management Policies/Actions, by User Group

Policy/Action Statement	Wilderness Users	Scenic Area Users	Camp-ground Users	Horse Users	Land-owners	χ^2
Mark trails with more blazes	42%	48%	41%	53%	56%	<i>ns</i>
Prohibit radios and cellular phones	50%	40%	54%	25%	27%	38.16***
Patrol backcountry areas more	32%	57%	41%	39%	53%	19.68*
Build more high quality trails	45%	60%	41%	46%	45%	<i>ns</i>
Provide more facilities for horse users	8%	4%	3%	85%	19%	244.40***
Provide simple pit toilets at campsites	28%	45%	30%	64%	53%	57.83***
Restrict number of users/establish use limits	38%	14%	43%	17%	26%	39.62***
Provide wooden bridges across streams	25%	43%	27%	34%	46%	25.69**
Put up more trail signs	37%	63%	51%	53%	59%	27.84**
Prohibit horses and pack stock	38%	35%	38%	7%	19%	148.49***
Provide fireplaces/cooking grates at campsites	18%	66%	44%	39%	49%	66.76***
Provide garbage/trash cans at the trailhead	71%	83%	82%	74%	87%	17.54*

Level of significance: *** $p < .001$. ** $p < .01$. * $p < .05$.

Knowledge of Leave-no-Trace Practices

The mail survey instruments included a series of questions designed to measure forest users' awareness of Leave-no-Trace (LNT) principles and practices (Table 33). In terms of self-perceived awareness, Wilderness users reported the highest awareness levels, and Scenic area users the lowest. Nearly all respondents in all groups had at least heard of the LNT program. The majority of the Wilderness users considered their LNT knowledge to be advanced or expert. The majority of landowners and horse users considered their LNT knowledge to be intermediate or lower.

Table 33. Self-Rated Level of Leave-no-Trace (LNT) Knowledge, by User Group

Self-Rated LNT Knowledge	Wilderness Users	Scenic Area Users	Camp-ground Users	Horse Users	Land-owners	χ^2 or F
Never heard of it	1.4%	6.3%	4.9%	1.6%	11.0%	$\chi^2=35.32^{**}$
Novice	3.6%	21.9%	11.5%	10.9%	13.7%	
Intermediate	35.4%	40.6%	34.4%	40.6%	30.8%	
Advanced	46.8%	28.1%	39.3%	34.4%	36.3%	
Expert	13.7%	3.1%	9.8%	12.5%	8.2%	
<i>Mean</i>	3.7	3.0	3.4	3.4	3.2	$F=6.27^{***}$

Level of significance: *** $p < .001$. ** $p < .01$.

When asked a series of specific questions assessing knowledge of LNT principles, the responses varied greatly for different questions and user groups (Table 34). Wilderness visitors generally showed the highest knowledge scores, followed by campers and Scenic Area visitors. Horse users and adjacent landowners showed significantly more incorrect answers to most of the questions on the LNT “knowledge quiz.”

Table 34. Percentage of Leave-no-Trace (LNT) Knowledge Questions Answered Correctly, by User Group

LNT Knowledge Question	Wilderness Users	Scenic Area Users	Camp-ground Users	Horse Users	Land-owners	χ^2 or F
When hiking and encountering a horse party you should wait until the horses have come to a stop and then move quickly past them. (False)	63.5%	48.1%	60.3%	42.7%	37.6%	24.65***
When camping in obviously impacted areas you should spread activities to places that have not been disturbed. (False)	78.7%	79.3%	74.6%	37.1%	63.5%	49.93***
I do not need a permit to spend the night in the HCWA. (True)	74.5%	46.7%	69.6%	19.8%	44.2%	79.52***
I cannot ride my mountain bike in the Wilderness, because it is not allowed. (True)	70.9%	56.7%	78.6%	18.8%	43.4%	83.64***
In the wilderness you should never camp next to a stream. (True)	69.5%	55.2%	70.7%	36.5%	30.7%	63.00***
If I wanted to ride my ATV in the wilderness, I could do so as long as I stay on the trails. (False)	85.6%	60.0%	86.2%	33.3%	59.4%	82.30***
When hiking in remote, lightly used locations of the HCWA it is best to camp on a site with no evidence of previous use to minimize your impact on the wilderness environment. (True)	30.7%	20.7%	40.4%	29.2%	24.0%	ns
Building temporary benches by moving rocks and logs at your campsite is an accepted low-impact behavior. (False)	81.9%	86.7%	82.8%	40.2%	51.8%	69.20***
When traveling on existing trails it is best to walk single file and stay on the main path to minimize impact. (True)	95.7%	100.0%	93.1%	56.8%	76.2%	72.10***
In the HCWA, it is OK to camp in direct view of the trail because the area is so small. (False)	64.4%	76.7%	83.3%	27.7%	29.1%	90.74***
When camping in the HCWA how far from a stream or water source (in feet) should you camp? (100 feet)	43.2%	33.3%	29.8%	26.7%	29.9%	ns
When camping in the HCWA how far from an established trail (in feet) should you camp? (100 feet)	41.0%	30.8%	31.6%	22.0%	26.3%	ns
LNT Quiz Score (Mean number correctly answered)	7.7	6.2	7.2	3.6	4.7	F=53.72***

Level of significance: *** $p < .001$. ** $p < .01$. * $p < .05$.

Conclusions

The purpose of this study was to enhance existing understanding of communication, information and education as resource management techniques. The study provides an analysis of diverse National Forest user groups' knowledge, behavior, and attitudes about Wilderness in general and the Hickory Creek Wilderness in particular. Surveys were conducted with five key stakeholder groups of the Allegheny National Forest (campground users, Scenic Area day visitors, Wilderness users, adjacent landowners and equestrians).

The user groups studied varied in their demographic characteristics, use patterns, knowledge, and information uses and preferences. Overall, maps and signs were the most frequently consulted information sources, followed by travel guides and tour books, brochures and pamphlets and visitor centers. Wilderness users tend to report the greatest information needs and are most likely to seek information before their trip. Adjacent landowners are mainly interested in information about hunting and fishing opportunities, and are least satisfied with existing information services. Day users generally expressed lower information needs and used fewer sources, but were interested in natural and cultural history information. Equestrians rely most heavily on ranger stations and trailhead signs for information and expressed the greatest need for information about rules and regulations.

Different types of information are typically sought from different sources. Generally, maps are sought from more diverse sources than other types of information. The different user groups varied in their use of information sources; for example, Wilderness users and landowners sought the most types of information from brochures, while campground users tended to use fewer sources of information. Forest users also show distinct preferences for obtaining various types of information at different times or stages of their visit; for example, most forest visitors would prefer to have maps of the area before making their trip, and those pursuing hunting and fishing in the Forest would like information on hunting and fishing opportunities before their trip to the area.

Visitor experience, attitude and knowledge were measured across seven dimensions. Trip planning varied significantly across user groups, with scenic area visitors more likely to make a "spur of the moment" decision to visit. Others planned their trips earlier but very few planned more than three months ahead. Roughly 40-50 percent of Wilderness, scenic area or campers were on their first visit to the Hickory Creek/Hearts Content Area, and landowners visited much more often during the past year, averaging over 25 days of use. Visitor

motivations were also significantly different among the user groups, although for about half of the motivation items there was a small or insignificant difference. Observing and enjoying nature received the highest ratings, and wilderness users differed from other user groups with a lower motivation to “meet friendly people” and a stronger motive to “get away from other people.” These differences in social and escape motives reinforce the different roles the area has for particular user groups. Place attachment was also different across groups: the landowners were the most attached, followed by horse, Wilderness, campground and the scenic area users. User satisfaction was high across all measured groups, with an average of about 8.7 on a 10-point scale. Customer service measures also show generally high ratings across facility, service, information and experience domains. There were significant differences across the user groups in understandable ways, e.g., the Wilderness users rated facility or staff services lower in importance while the scenic area and campground users gave the highest ratings of performance. Finally, awareness of LNT principles was as expected: Wilderness users are the primary target audience and scored the highest. Horse users and landowners had the lowest scores on this “knowledge quiz.” There were statistically significant differences on 9 of the 12 LNT knowledge questions across the five user groups.

Overall, study results demonstrate the importance of knowing your customers and your windows of opportunity for information and education programs. These results also suggest the importance of a diverse and strategically implemented communication plan that includes all significant user segments/communities, and that provides information to them in different ways based on substantive differences between user segments..

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The following are also products from this project and may be of interest to readers:

Absher, J.D., Graefe, A. R. & Confer, J.J. Differences in information needs and preferences of national forest visitors. Paper presented at the Seventh International Symposium on Society and Resource Management, Columbia, MO, May 27-31, 1998.

Confer, J.J., Absher, J.D., Graefe, A.R. & Hille, A. (1998). Relationships between visitor knowledge of "Leave-no-Trace" minimum impact practices and attitudes toward selected management actions. In H.Vogelsong (Ed.) *Proceedings of the 1998 Northeastern Recreation Research Symposium*, General Technical Report: GTR-NE-255. Newtown Square, PA: USDA Forest Service, Northeastern Research Station. pp. 142-146.

Confer, J.J., Mowen, A. Graefe A.R. & Absher, J.D. (2000). Magazines as wilderness information sources: differences in users' general wilderness knowledge and specific LNT knowledge. In D. Cole, et al. (Comp.) *Wilderness Science in a Time of Change Conference-Volume 4: Wilderness Visitors, Experience, and Visitor Management*. General Technical Report, RMRS-P-15 Vol. 4. Missoula, MT: USDA Forest Service, Rocky Mountain Research Station. pp. 193-197.

Graefe, A. R., Absher, J.D. Confer, J.J. & Thapa, B. (2000). The role of user surveys in the development of an information and education plan for the Allegheny National Forest. Paper presented at the International Symposium on Society and Resource Management, Bellingham, WA, June 19-22, 2000.

Graefe, A. R., Thapa, B. Confer J. J. & Absher, J. D. Relationships Between Trip Motivations and Selected Variables among Allegheny National Forest Visitors. . In D. Cole, et al. (Comp.) *Wilderness Science in a Time of Change Conference- Volume 4: Wilderness Visitors, Experience, and Visitor Management*. General Technical Report, RMRS-P-15 Vol. 4. Missoula, MT: USDA Forest Service, Rocky Mountain Research Station. pp. 107-112.